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Project

A project is a unique and temporary endavour to achive a specific goal It involves deklopment of s/w product / system.

It is a group of tasks that are carried out to reach a clear result.

Also defined as set of input & output to achieve a goal.

Output is a unique product / service / Result

They end when goal is achieved

Operations

work done in org to sustain business.

Program

set of Related objects (projects) manage in a cordinated way

For complex project, project is broken to subproject in which one can organise the implementation of some specific objective for larger project.

Project Attributes

Unique, temporary, Require Resources such as people, s/w, h/w, assets, Deadline, Objective, Customer / Sponse

management of s/w development project =>
Involves creation of project to create unique product / service.

SPM

Art & Science of planning and leading s/w project
It is integration of Management techniques into s/w development
Started in 1960's.
Imp part of SE, involves planning, executing, controlling s/w to deliver high quality product on time & within budget.

Three Need:
Time, Cost, Quality

Key Aspects: Lifecycle
- Progression initiation
  ⇒ Define objective & scope, req, prepare plan.
- Project Planning
  Detailed plan outting tasks, timelines, Cost Estimation, Risks, etc
- Project Scheduling
  Schedule tasks & Allocate Resources
- Resource & Risk Management

Lifecycle - stages a project go through till completion
Each phase has its characteristics, activities & deliverables
Help to guid project progress. Provide structure

- Communication & Reporting
- Closure & Evaluation
- Documentation
- Delivery.

Initiation
Plan
Execution
Monitor & Control
Closure

Effective SPM is needed for delivery of good s/w that meet user req as a combination of tech skills, leadership, etc.

S/w are 'invisible'

Risk of technology/data	Risk of safety, env
S/w Project	Other Project
- specific to s/w	Broad term
- Not tangible	tangible
- Not clearly defined	Define
- No fixed production	fixed prod
- Easily Customize	Require efforts
- Easy to copy & distribute	Not
Shorter timeframe	Longer
Ex - Mobile websites	Ex - Construction, Manufacturing, Research
Include coding	May / May not
Importance	

Complexity Management : Some projects are very complex SPM is needed to carry them smoothly in dynamic env

Characteristic of project
obj, Scope (features/func), timeframe, resources, budget, Quality, Risk, Comm, Documentation

- Resource Allocation: Resources (time, human effort, budget) should be used to full potential
- Meet Deadlines, manage lost
- Risk Mitigation: Every s/w involves Risks such as technology changes, scope changes, new market req, etc.
- Adapt changes.

SPM provide structural Approach to tackle these.

PDF → Delivery: on time delivery
See Objective & Principles

PROJECT MANAGER

A professional Responsible for overseeing all aspects of project from initiation to completion.
They are essential to manage skill, allocate resources, effective comm under team & stakeholder, & ensure that Project is completed with in budget & delivered with high quality

Role
→ Leader - lead team & give direction
→ Medium → b/w client & team
→ Mentor → in Right direction

Focus on Quality, Communicates, Manage Budget

→ Manage Risks & issues
→ Planning & sequencing
→ Repot & Monitor Progress → listen to feedback
→ Modify Plan acc to need
→ Solve internal problems
→ Manage Budget

Principle

1) Clear Obj
2) Effective Planning
3) Risk Management
4) Monitoring
5) Adaptability
6) Improvement

Tools & Techniques

Tools

1) Software Management Application: For planning
2) Product Roadmap: Track updates
3) Analytical tools: see how people use
4) version control: Keep track of changes
5) Customer feedback Tool:

Techniques

1) Market Research
2) A/B testing: version testing
3) User persona
4) Usability testing
5) Prioritization techniques

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S/w Project Scheduling.

Process of planning & organising tasks, resources, & timelines required to successfully complete a software development project.
It is a crucial aspect of SPM to carry out specific activities in lifecycle.

Key steps:

- Task identification ⇒ identify all tasks req for project including planning, execution, testing, doc, deployment
- Task Sequencing → Identify dependencies & arrange them
- Task dependencies → as one task may rely on other
- Resource Allocation to Each task
- Duration Estimation to complete task
- Critical Path Analysis
- Monitor & Control

- Comm
- Risk Management

It is imp formeeting project deadline, & budget, changes with time under all circumstances.

Estimation

Objective of estimation is to provide a structured & systematic approach to determine expected cost, resource & timeline

It is imp for 5 reasons
Budgeting, Resource Managent, Risk Managent, Scope Definition, Project Scheduling.

It include h/w & liscencing cost also
→ Quality Assurance - to plan things accto quality.

↳ other points in wkd.

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Work Breakout Structure

It is a project Management tool that takes step by step approach to complete large projects

It involves breaking down project to smaller component & combine to form a solution

WBS can integrate scope, cost, & deliverables into single tool.

→ Include dividing complex problem to simpler managable, independent tasks

→ Top Down Approach

→ Performed By project Manager & Subject Matter Expert.

→ Root of tree is labelled by Project Name

Structure

→ Level 1 (Big Picture) → Name of Project

→ level 2 → diff major phase of Proj ex- planning, designing, testing

→ Level 3 → getting specific to each phase

→ level 4 → Sometimes we need more details so break them into more simpler tasks.

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Why WBS is imp?
It helps everyone involved in project to understand what exactly they should do
It serves as a clear map that guides the team
It helps with:
- Organisation → makes project easier to manage because you know what happens at each level
- Planning → to plan how long each task take
- Responsibity → who is in charge of which task
- Tracking

N/w Planning Model

scheduling / managing complex tasks

It is scheduling project activities & their relationship as a n/w. In this time flows from left to Right

It is essential technique for project Management for scheduling & controlling activities. They provide visual representation of tasks, their dependencies, their critical path, helping project Manager to understand flow, timelines, & make informed decision.

This is done by drawing diagrams.

It uses graphic representation of activities & events to vizualize sequence of tasks to complete a project.

CPM

CRITICAL PATH METHOD

deterministic model for scheduling also called critical path Analysis is a n/w diagramming technique used to predict total project duration.

A critical path for a project is the series of activities that determine the earliest time by which project can be completed

- No of activities are fixed.
- It is the longest path through the network diagram and has least amount of slack or float (the amount of an activity can be delayed without delaying succeeding activity).

It helps to determine most crucial tasks, dependency b/w tasks & shortest time needed to complete a task.

Based on
Activity oriented structure

Key concepts in CPM:

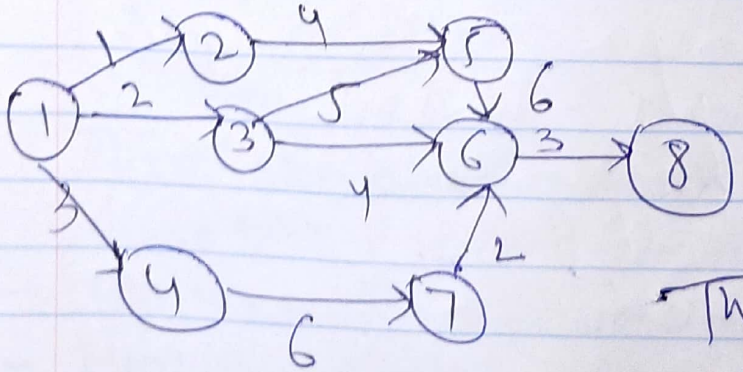
1) Tasks & Activities - individual jobs/work need to be done to complete the project. Each task has a defined duration & may have dependencies on others.

2) Dependencies - tasks are connected by dependencies, which indicate order in which they should be carried out.
- Finish to Start - B cannot Stat until A finis
- Start to Finish - B cannot finish till A start
- Start to Start - B can't start till A start
- Finish to Finish - B can't finish till A finish

3) Duration - estimated time to complete

Working

CPM work by first creating a n/w diagram based on WBS. CP involves durations of all activities



longest path is
1, 3, 5, 6, 8 = 16 days.

This is Critical Path.

longest Path with shortest time

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Benefit

- Efficient Scheduling - Schedule more conviniently by identifying shortest pattern.
- Visibility - It provides a clear visual representation of tasks
- Risk Management - ProjectManages can focus on tasks & plan potentialy.
- Resource Allocation - ensure tasks has all resources at timeofstart
- Project Control - for better adjustment & Progress.

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Pert

Program Evaluation & Review Technique

Network Project Planning model developed in 1950's to handle complex project used when there is uncertainity in task duration. Particularly useful for projects with more interdependent tasks where one task may take longer time due to unforeseen ~~task~~ factors.

N/W diagram in this are refered to as PERT charts.

It uses probalistic time estimates ie duration estimates Optimistic, pessimitic instead of being specific as in CPM.

PERT weight avg = $\frac{\text{Optimistic time} + 4 \times \text{most likely time} + \text{pessimistic time}}{6}$

Key Aspects

Task Duration: Each task is assigned 3 duration

- Optimistic (O) shortest possible time task take
- Most Likely time (M) - best estimate under normal cond
- Pessimistic - Longest time it could take.

- Expected time - of each task by using weighted avg
  O + 4M + P / 6

- Variance - how much the actual duration of a task is likely to differ from expected
  [P - O / 6]^2

- Network diagram ○ - event
  → → tasks.

Critical Path → Sequence of tasks that takes longest time to complet

Benefits

- Uncertainity Management → PERT is excellent for uncertain tasks, help to handle problems
- Resource Allocation - Consider Resource constraints, help allocate Resource
- Probability Assesment - for better understanding of deadline
- Complex Project Management - task Management.

Optimistic Estimation : When estimating task duration optimistically, project manager assume that the task will be completed quickly & smoothly with no delays

Pessimistic Estimation : Calculates the longest time a project may take due to potential problems, delays, risks. Project Manager use this to identify backup plans against unexpected difficulties.

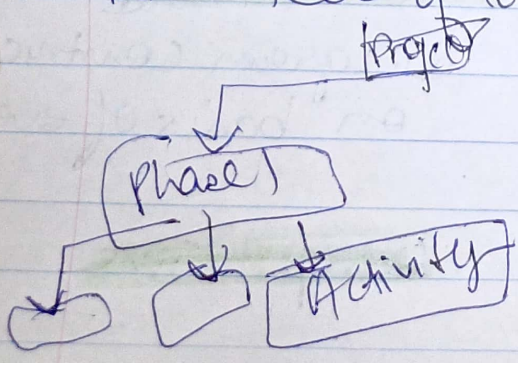
Realistic Estimate - PM often uses a realistic or most likely estimations which falls between optimistic & pessimistic.

CPM	PERT
used to manage certain (where time is known) activities	uncertain
Deterministic Model	Probability Model
Activity Oriented i.e diagram constructed on basis of activities.	Event oriented ie diagram constructed on basis of event
For Repetitive natured jobs.	Unrepetetive

formell defined tasks	for undefined tasks
Assumes fixed task duration	not fixed
Primarily focus on task scheduling	on Resource Scheduling as central
Calculation of Expected time not applicable	Calculated by weighted avg of O, M, P. PAHTO 6
Less flexible in accomodating uncertainity	More flexible in handelling uncertainity

TOP DOWN APPROACH

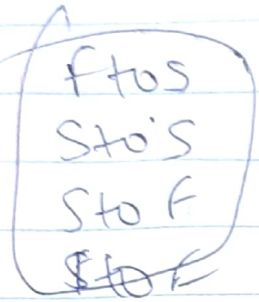
to s/w effort estimation begins by defining high la objective & scope of project & then breaking in components in hierarchical structure (WBS) The estimate of each task added to get an initial idea of total effort needed.



PDM

Precedence Diagramming Method is a n/w diagramming technique in which boxes represent activities. It is particularly useful for visualizing certain types of time Relationships.

FtoS
StoS
StoF
~~FtoF~~



Else in PDF.

It represent Logical Relationship b/w activity using n/w diagram

Use PDM when:

- Complex Task Dependencies : with multi dependency or constraint
- Logical Relationship
- Resource Scheduling : to see which tasks can Run parallel based on dependencies.

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Initiation
→ Define purpose, goal, Obj
→ Identify Roles

Planning
Detailed Plan
Visual Representation
Cost Estimation, Resource Allocation

Execution
Put Plan to action
Assigned member start their rolee
Resources used effectively

Monitor Control
Ensure that team remains on goal to complete target
Track progress against plan
Manage scope

Close
Complete all project deliverables
Create a documentation.
Check evrthing & deliver project on time.

PDM

To plan & schedule task in a project

Process of showing logical Relationship b/w tasks of a project

It helps to identify which task need to be compled before starting next

we use arrows to connect tasks showing dependencies

Explain
FtoF, StoS, FtoS, StoF.

Element

1) Task Dependency - FS, FF, SS, SF.
PDM is all about showing how diff task depend on each other
2) Nodes & Arrows
tasks are boxes & dependencies are arrows connecting tasks.

Advantages

- Clarity
- Complex Project
- Critical Path
- Resource allocation
- Scheduling Flexibility

CPM in PDM → longest path of task in less time

Gantt Chart

is a visual project Management tool used to plan, schedule & track tasks & activities over time

It provides a timeline view of project showing when task start & finish, their dependencies & how they progress.

Widely used for various industries for planning & ~~pt~~ managent

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S/W Effort Estimation

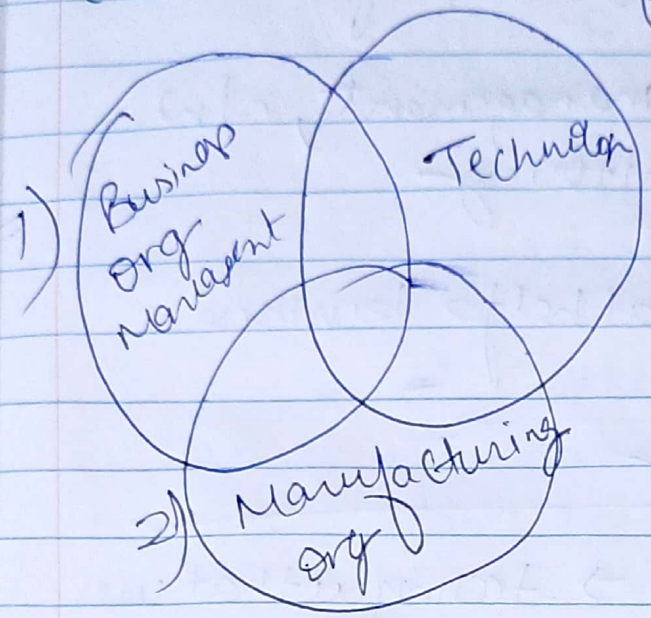
Critical process that helps project managers, du to understand resources req to complete a sofwore project successfully. It involves predicting amt of work, measured in person hour/ days to complete project. Accurat effort estimation is essential for planning, reso allocation, budget management, etc.

Methods: Expert Judgement (expert make g
Analogous Est (uses historical data with simil
Parametric model (previous ans is used, math eq)
Bottom-Up (break into smaller comp
smaller aggregated)

TOP DOWN DPP s) 2 page pehle

3 Sphere Model

conceptual framework that represent interconnectedness of 3 element of an org



1) It involves planning, organising, leading & controlling business activities to achieve goals & objectives
- it represent top level concerns of system
- It encompasses strategic planning, defining budget, ensuring rules & Regulations.
- By Business decision are made.

2) Manufacturing or Operation Organisation.
Actual work happens here. Here Services are provided
Focus is on production & Operational aspects
Create & deliver product of good quality

Technology Sphere
Concerned with technical aspects of managing I.T system/infracture

Cover h/w & s/w management, n/w management & monitoring.

Gadgets & tools that help business Run smoothly
Ex - Machinery

Parametric Model → technique that use mathematical model to estimate project attribute such as cost, time, effort, resources etc. Also called Parametric Estimation Model. It use maths & historical data to make estimates considering parameters & characteristics.
Ex - To make a cake, parametric modelling consider ingredients & time (recipe) to make cake to predict

These model can be quite accurate when parameters are well defined & historical data is relevant
Ex - COCOMO model